

# Study of Drug Interactions and Associated Factors in Prescriptions of General Practitioners in Ardabil City, 2013-2014

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## Abstract

**Background:** Drug interactions are made very serious problems for thousands of people every year. In most cases, doctors and pharmacists have not spent enough time for careful monitoring of patients in terms of drug interactions harmful effects.

**Aim:** The aim of this study was to investigate the frequency of drug interactions and associated factors in prescriptions of general practitioners in Ardabil city.

**Materials and Methods:** This descriptive cross-sectional study has been done on 1000 prescriptions in Ardabil city which randomly selected from all prescriptions. Necessary information such as sex, the number of prescription items, the degree of doctor, and place of practice completed by a checklist. For obtain drug interactions, we used drug interaction facts and for analysis data we used SPSS 19.

**Results:** Overall incidence of drug interaction was 19.7% from that 9.13% was severe, 37.1% was moderate and the rest had minor interactions. Drug interactions in specialties were more than general doctors. Prescriptions of male physicians had a significant increase in drug interactions. Increase in mean number of drugs in each prescription caused to a significant increase in the incidence of drug interactions.

**Conclusions:** Knowledge of drug interactions and replace them with other drugs and decreasing the number of drugs we can reduce significantly these interactions.

**Keywords:** Drug interactions, Incidence, Prescriptions

## INTRODUCTION

One of the biggest issues facing healthcare organizations today is how to maintain patient safety. Several studies show that each year more people die due to medical errors that medical errors and accidents caused by drug side effects are in the first place. These errors are usually expensive and clinically important topics.<sup>1</sup>

The process of pharmacotherapy consists of five steps prescribed medication, duplication, drug distribution, drug use management, and monitoring of treatment. Medical errors can occur at each of these stages, but drug interactions may occur only in the prescribed step.<sup>2</sup>

Drug interactions are one of the most important drug mistakes which are only predictable and preventable by revision of previous documentations, reports, and clinical studies. However, most physicians are unaware of major and clinically important drug interactions.<sup>3</sup>

Drug interactions defined as a pharmacological or clinical response induced by administration of two or more drugs.<sup>1</sup>

Using two or more prescribed drugs may lead to drug interactions. Some drug interactions are very harmful and

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may have potential threats to the patient's health that is called antagonism.<sup>4</sup>

Drug interactions are not limited to the co-administration of two or more drugs, and can occur in the forms drug interactions with drug, drug with food, drug with disease, and drug with environmental factors.<sup>5</sup>

Furthermore, drug interactions each year due to the increased length of hospitalization impose an enormous cost to the society economy and even in some cases this drug interactions may lead to patient's death.

In Iran, 8% of hospital treatment will leading to side effects, which is more than the American country (2.4-5.6%).<sup>2</sup> Study in Nepal at 2010 showed that from 2985 prescribed drugs, the error occurred in the 1233 drug (41.3%).<sup>6</sup>

In Gurvitz *et al.* study, the incidence rate of unwanted side effects in patients up 65 years, was about 50 per 1000 patients.<sup>7</sup>

Due to the lack of similar studies in this area in Ardabil province, this study aimed to investigate drug Interactions and associated factors in prescriptions of general practitioners in Ardabil city.

## MATERIALS AND METHODS

In this cross-sectional study, 1000 prescriptions selected randomly from all prescribed prescriptions by general practitioner from April 2013 to December 2014. Available data on prescriptions included physician identification, name, sex of the patient, and quantity of the medications dispensed. Information such as the number and intensity of interactions and drug interactions causing interference was calculated by the software drug interaction facts.

This software, in terms of severity of drug interactions are divided into five categories

Interference with life-threatening or may cause permanent damage (severe).

Interference with the patient's clinical condition worsened and we find the need for additional treatment or the patient may be admitted to our hospital for a long time (medium).

Interference effects are usually mild, but they cannot affect the outcome, so there is usually no need for additional treatment (mild).

Interference that may cause moderate to severe side effects, but there is not enough information in this case (unknown).

Interference effects may be severe, but it is highly unlikely, or there is no evidence of clinical effects (inconsistent).

Collected data were analyzed by statistical methods in SPSS 19.

## RESULTS

From all 1000 prescriptions, 611 prescriptions (61.1%) were for male patients (Table 1).

In summary, 197 (19.7%) interactions were seen in all prescriptions.

543 (54.3%) of all prescriptions has been scribed by general practitioners (Figure 1).

Totally, 197 interactions were seen in 132 prescriptions, which from them 92 (69.7%) prescriptions have one interaction (Figure 2).

Aspirin with 38 (19.3%) of all interactions has the most common drug interactions with other drugs. The most common drug interactions were seen between atorvastatin and gemfibrozil with a severe degree of interference, and the frequency was four. Of all 197 drug interactions, 73 interference (37.1%) was Type 2 (moderate) (Figure 3).

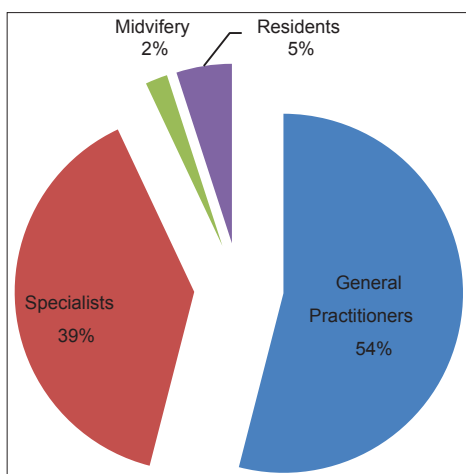
Most of drug interactions with 58.4% related to specialists and rest of them for general practitioners.

With increasing the number of prescribed drugs, the number of drug interactions had been increased significantly ( $P = 0.001$ ). Male physicians have significantly more drug interactions than female physicians ( $P = 0.004$ ).

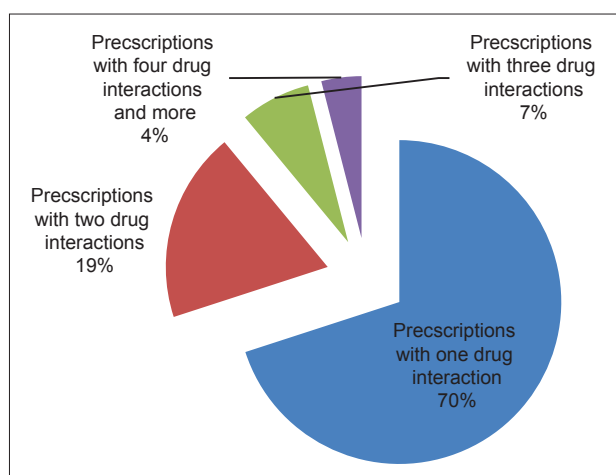
There was not significant relationship between drug interactions and place of practice. Specialists with mean drug interactions  $0.29 \pm 0.8$  have more interferences than others.

**Table 1: Characterized variables in study prescriptions**

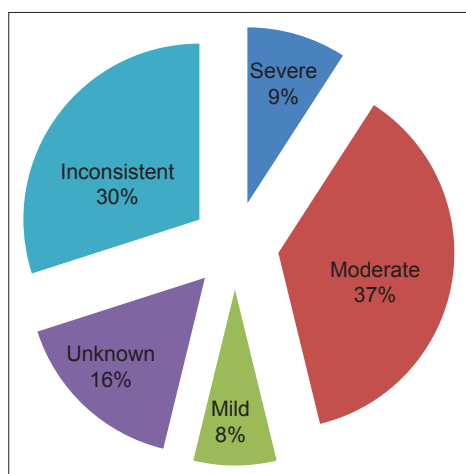
Variables	N (%)
Sex of patients	
Male	611 (61.1)
Female	389 (38.9)
Drug interactions	
+	197 (19.7)
-	803 (80.3)
Place of practice	
General clinic	103 (52.3)
Private clinic	94 (47.7)
Sex of prescribers	
Male	612 (61.2)
Female	388 (38.8)



**Figure 1: Prescriptions by doctor specialty**



**Figure 2: Prescriptions with number of drug prescriptions**



**Figure 3: Type of interference in prescriptions**

## DISCUSSION

Drug interactions have been introduced as one of the major errors in prescribing medication and several factors

can cause to drug interactions which it can be noted the important role of human factors.<sup>8</sup>

Results showed that the rate of drug interactions in these prescriptions was 197 (19.7%) which from them 9.1% have severe drug interactions.

Khouri *et al.* in study resulted that 8.2% of all studied prescriptions have drug interactions which 8.7% of them have severe interference.<sup>8</sup>

When compared our study results with other places, we could result that more than half of prescriptions in Ardabil province have interference Types 3 and 4 that no have effective on treatment result and no need for additional treatment, but in Gorgan study, more interferences have Type 2 (moderate) which can worsen the patient's clinical status.<sup>8</sup>

In Pudasaini *et al.* study, 16% of prescriptions have interference and the rate of drug interactions in specialists with 58.4% was significantly more than general practitioner.<sup>9</sup>

In Khouri *et al.* study, the rate of drug interactions in general practitioner was significantly more than specialists which this difference can be due to aspirin interaction with more drugs in specialists prescriptions and in our study, 19.3% of interactions related to aspirin interaction with other drugs.<sup>8</sup> With increasing the number of prescribed drugs, the number of drug interactions had been increased significantly ( $P = 0.001$ ). This finding is similar to Rafeian *et al.* study. One reason for the large number of drugs prescribed, resulting in high rates of drug interactions can result in urging patients to prescribe more drugs and with an increasing number of drugs in a particular situation, find drug interactions will be difficult.<sup>10-12</sup>

In our study similar to Khouri *et al.* study, the study revealed that there was not relationship between place of practice and patients' sex and drug interaction prevalence. 84.8% of drug interactions have been occurred by male and 15.2% by female physicians and there was significant relation between sex of physician and number of interferences ( $P = 0.001$ ) which was similar to other study results and this can be probably noted to the greater sensitivity of female doctors in prescribing which further studies are needed to prove this.<sup>8</sup>

## CONCLUSION

The prevalence of drug interactions (Type 1-5) in Ardabil city prescriptions with 19.7% was more than other studies. However, regardless of Types 4 and 5 interactions that are of clinically not importance, the rate of interactions

with 10.6% has not difference with other studies. 46.2% of drug interaction was clinically important and so, risk of incidence complications from these drug interactions in patients is high and follow-up of patients and some tips to avoid such complications is essential. In this study, the prevalence of drug interactions had a significant relationship with various factors such as gender, doctor specialty (specialist or general), and the mean number of drugs prescribed per prescription which need to exact and wide study in future. Furthermore, by the appropriate dosage adjustments or modifications and or correction method and time-consuming, we can prevent many of the negative effects from drug interactions.

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## REFERENCES

1. Nabavizade H, Khoshnevisan F. Drug interactions in prescriptions of general practitioners in Yasuj city. *Armaghan Danesh J* 1371;7:53-60.
2. Moghaddasi H, Sheikhtaheri A, Hashemi N. Reducing medication errors: Role of computerized physician order entry system. *J Health Adm* 2007;10:57-67.
3. Ahmadizar F, Soleymani F, Abdollahi M. Study of drug-drug interactions in prescriptions of general practitioners and specialists in Iran 2007-2009. *Iran J Pharm Res* 2011;10:921-31.
4. Madadi MS, Bojmehrani H, Azari M. Evaluation of drug interactions and prescription errors of poultry veterinarians in North of Iran. *Poult Sci J* 2014;2:25-35.
5. Esteghamat S, Esteghamat S, Bastani F, Kazemi H, Koulivand P, Bayan L, *et al.* Potential drug interactions in war-injured veterans with psychiatric disorders. *IJWPH* 2012;4:24-31.
6. Sapkota S, Pudasaini N, Singh C, Sagar GC. Drug prescribing pattern and prescription error in elderly: A retrospection study of inpatient record. *Asian J Pharm Clin Res* 2011;4:129-32.
7. Gurwitz JH, Field TS, Harrold LR, Rothschild J, Debellis K, Seger AC, *et al.* Incidence and preventability of adverse drug events among older persons in the ambulatory setting. *JAMA* 2003;289:1107-16.
8. Khouri V, Semnani SH, Roshandel GH. Frequency of drug interactions and associated factors in insured prescriptions in Gorgan City. *Med J Tabriz Univ Med Sci* 2005;4:29-32.
9. Pudasaini N, Singh C, Sagar GC, Sapkota S. Drug prescribing pattern and prescription errors in elderly: A retrospective study of inpatient record. *Asian J Pharm Clin Res* 2011;4:83-6.
10. Nejad SM. *The Most Important Drug Interactions*. 1<sup>st</sup> ed. Tehran: Tayyeb Publication; 1383. p. 1-3.
11. Rafiii H, Arab M, Ranjbar H, Sepehri GH, Arab N, Amiri M. The prevalence of potential drug interactions in intensive care unit. *Iran J Crit Care Nurs* 2010;4:191-6.
12. Rafeian M. Drug interactions in internal and surgical wards of Kashani Hospital, Shahrekord, 1997. *Tehran Univ Med J* 2001;59:86-91.

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